

Effect of maceration on digestibility and energy content of low-moisture round bale alfalfa silage

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Summary

The quality of alfalfa round bale silage (RBS) is heavily dependent upon weather conditions. Recently, several mechanical maceration treatments for freshly cut forage material have been developed. NISHIZAKI et al. (1997) reported that the maceration with a prototype mat maker increased the drying rate of alfalfa in the fields. This faster drying could be caused by the expanded surface area due to stems torn to numerous fibrous pieces and severely damaged the cuticle. CHARMLEY et al. (1997) suggested that maceration might improve apparent digestibility of forage. While this has been shown in the studies with hay (PETIT et al. 1994), no such increase in digestibility has been observed with precision-chopped silage (CHARMLEY et al. 1997, FROST et al. 1995, MERTENS and KOEGEL 1992). We also found that maceration had no effect on the digestibility and energy content in 20-mm chopped low-moisture RBS (NONAKA et al. 2001). Thus, this experiment was designed to investigate the effect of maceration on digestibility and energy contents of low-moisture RBS which was chopped longer (200-mm) than that of previous study.

First and third cut alfalfa (*Medicago sativa* L.) were harvested at the 10% bloom stage. The harvested alfalfa was then treated by 1) maceration, processed with a large-scale forage mat maker prior to wilting to approximately 50% DM content (FM-treatment), or 2) windrow inverting conditioning, in which the alfalfa was wilted with windrow inverter at the same period as that of the FM treatment (WI-treatment). After that, forage was baled in large round bales.

After being stored for 3 months, the silage bales were chopped into 200-mm pieces using a forage harvester and re-ensiled in 200-liter silo for each experiment. Silage digestibility, total digestible nutrients (TDN), digestible energy (DE) and metabolizable energy (ME) contents of FM- and WI-treated silage were measured using a respiration chamber. Two dry cows were assigned to two dietary treatments for 14 days in a crossover experiment. The cows were fed an all-forage diet. The amount of feed given was adjusted to 110% of the requirement for maintenance on a TDN basis.

Maceration reduced the field-drying time. DM contents of FM- and WI-treated silage were 55.4% and 39.1% (in first cut), 56.7% and 44.3% (in third cut), respectively. The leaf ratio of FM- and WI-treated RBS were similar. There were no differences between FM- and WI-treated RBS in DM, CP, ADF and NDF digestibility. Furthermore, GE, DE, ME and TDN contents of FM- and WI-treated RBS were similar. These results suggested that maceration has no effects on digestibility and energy content of low-moisture RBS.